SPECTROSCOPIA MOLECULAR

UN PERIODICO DE NOVAS E INFORMATIONES DE INTERESSE E VALOR AL SPECTROSCOPISTAS

Publicate in interlingua per Forrest F. Cleveland, Professor de Physica, Instituto Technologic de Illinois, Chicago 16. Consiliero linguistic, Dr. A. Gode, Division de Interlingua, Science Service, 80 East 11th St., New York 3. 12 numeros per anno, $2.25. Le periodico depende de receptas financiari ab illes qui beneficia de illo.

LE SPECTROSCOPIA DE REACTIONES CHIMIC RAPIDE

LE OBSERVATION de relativemente grande concentrationes de radicales libere post un irradiation instentanee de un gas con un lumine intense ha ducite a un studio del cinetica de reactiones chimic rapide per le uso del spectroscopia de absorption.

Recentemente, H. H. Kramer, M. H. Hanes, e E. J. Bair ha describite experimentos in le quales mesurationes de absorption con duple fasces esseva facite a un alte resolution spectral (melior que 50 mÅ in le visibile e le ultravioletto proxime) e a un sequentia de intervallos de tempore de un micritude de usque a 200 μsec.

Isto esseva complite con un monochromator e un detector de photomultiplicator dual, usante un fonte de lumine instantanee de xenon stroboscopic. Signales representante le rationes de absorption esseva registrate super un banda magnetic, tunc convertite con un integrator digital.

Un prova quantitative de iste methodo esseva facite per observar le reaction del recombination de iodo post un photolyse con lumine intense instantanee. Le precision del resultatos se comparava favorabilemente con previe mesurationes pro le quales le largessas spectral del bandas esseva un mille vices plus.

Le uso de iste methodo de mesurar le velocitate del reactiones de radicales libere esseva illustrate per un explication del resultatos obtenite pro le radicales NH_2.

Le recerca esseva facite in le departimento de chimia al Universitate Indiana a Bloomington in Indiana, S. U. A., e le resultatos es describite in J. Opt. Soc. Am. 51(1961)775-9.

In le passato, spectros de absorption esseva photographate durante un intervallo specific post le comenciamento del reaction. Effectos cinetic esseva observate per un repetition del experimento pro intervallos differente. Sed le spectros assi obtenite esseva pro reactiones differente.

Le avantage del presente methodo es que omne le spectros es obtenite durante un sol reaction, e que le grande intensitate del fonte de xenon permitte le uso del alte resolution que es requirite pro le plus grande numero de radicales libere. Le precision es circa 1 pro cento. ô

Gemma de Sagessa

NIHIL IN le affaires human es plus mysteriose que le potentia de penetration de grande ideas.

-- NORMAN COUSINS
Saturday Review
1 April 1961

SPECTROS INFRARUBIE DE GASES ADSORBITE

LE SPECTROS infrarubie de gases adsorbite es discutite in un articulo per V. Crawford in Quarterly Reviews 14(1960)378-401 (Lab. de Chimia Physic, Imperial College of Science and Technology, S. Kensington, London S.W.7, Anglaterra). Le spectrometro infrarubie ha establite se como un utensile pro le studio de tal adsorption.

Adsorption Physic

Quando un molecula de gas approcha le superfacie de un solido, un interaction inter le molecula e le superfacie occure, le energia de interaction U(r) essente un function del distantia r ab le superfacie. Irrespective de su forma functional, $U = 0$ quando $r = \infty$, e $U = \infty$ quando $r = 0$. Si le minimo de adsorption in le curva U verso r trova se a valores de r al quales il ha practicamente nulle superposition del functiones de unda del molecula e le rete crystallin del solido, tunc adsorption physic ha occurrite.

Le prime parte del articulo discute iste typo de adsorption. Considerate es le resultatos spectroscopic expectate ex le effectos perturbational del fortias de superfacie super le moleculas adsorbite, e vice versa, incluse le requirimentos experimental pro le observation de tal spectros.

Adsorption Chimic

Si le minimo del curva occurre a valores de r que es sufficientemente micre pro causar un superposition appreciabile del functiones de unda, tunc un adsorption chimic, o chimisorption, ha occurrite. In iste caso, le fortias que tene le moleculas es de un natura valentic e forma nove ligamines.

Le secunde parte del articulo discute iste typo de adsorption, e predice un plus grande uso del infrarubio in le studio de adsorption.

SPECTROS ULTRAVIOLETTE REMOTE

UN REVISTA del disveloppamentos in le ultravioletto remote depost 1950 es date in un articulo per G. Herzberg, A. Monfils, e B. Rosen in Mémoires Soc. R. Sc. Liège, cinquième série, tome IV, fasc. unique. Un reimpression de isto pote esser obtenite ab le autores al Division de Physica Pur, National Research Council, Ottawa 2, Ont., Canada o al Instituto de Astrophysica, Univ. Liege, Belgica. Le articulo es in francese.

Post un breve summario del disveloppamentos theoric e del innovationes in re le technicas, le spectros de plure moleculas individual es considerate. Istos include H_2, N_2, N_2^+, O_2, NO, NO^+, C_2, CH, CN, CN^+, CO, CF, F_2, HF, CH_2, CH_3, H_2O, CO_2, N_2O, NO_2, O_3, HCN, NH_3, C_2H_2, e CH_4.

Le articulo extende se ab p. 146 a p. 178, e il ha un bibliographia con 136 referentias. ô

LE STRUCTURA DE OF_2

LE VALORES medie del constantes rotational de OF_2, obtenite ex un investigation microundic[1], es

$$A = 61,56771 \text{ Gc/s},$$

$$B = 11,06654 \text{ Gc/s},$$

e

$$C = 9,34385 \text{ Gc/s};$$

e le valores correspondente del momentos de inertia principal, calculate ab istos, es

$$I_A = 8,21096 \text{ amu } Å^2,$$

$$I_B = 45,6809 \text{ amu } Å^2,$$

$$I_C = 54,1038 \text{ amu } Å^2.$$

Le distantia internucleari O-F, e le angulo de apice F-O-F, es 1,3896 Å e 104,163°, respectivemente. Le defecto inertial $I_C - (I_A + I_B)$ es +0,217 amu $Å^2$

[1] A. R. Hilton, Jr., A. W. Jache, J. B. Beal, Jr., W. D. Henderson, e R. J. Robinson, J. Chem. Phys. 34(1961) 1137-41; Depto. de Chimia, A and M College, College Station, Texas. ô

UN STANDARD DE INTENSITATE INFRARUBIE

UN SPECIMEN convenibile pro uso como un standard de intensitate in le spectroscopia infrarubie deberea haber plure bandas de absorption de intensitates appropriate le quales es ben-spatiate. Illo deberea esser facile a preparar, e deberea haber un stabilitate chimic e physic.

Un tal standard es proponite per W. C. Steele e M. K. Wilson (Depto. de Chimia, Universitate Tufts, Medford, Mass., S.U.A.) in Spectrochimica Acta 17(1961)393-5. Isto consiste de un disco de KBr le qual contine 0,035 pro cento del hydroxydo de magnesium, 0,10 pro cento de p-cyanobenzeno, e 0,02 pro cento de anthraceno.

Le specimen ha bandas de intensitate convenibile a 2,7; 4,5; 6,6; 7,2; 7,8; 8,3; 11,3; e 13,8 μ. ô

SPECTRO ROTATIONAL DE CYANAMIDO

LE SPECTRO rotational del vapor de cyanamido a 20°C ha essite obtenite per le methodo microundic in le regiones 20, 40, e 60 Gc/s (G = giga = 10^9) per G. P. Shipulo (Optika i Spektroskopiya 10 (1961) 553; Optics and Spectroscopy 10(1961)288-9). Isto indicava que le structura es $H_2N\text{-}C{\equiv}N$, con un symmetria C_{2v}, congruente con le previe resultatos de Davies e Jones (Trans. Faraday Soc. 54(1958) 1454) pro le stato solide.

Le constantes rotational in Mc/s es:

$$B_o + C_o = 19995{,}8 \pm 0{,}2;$$

$$B_o - C_o = 264 \pm 0{,}3;$$

$$D_{JK} = 0{,}56 \pm 0{,}05;$$

$$D_J \approx 0{,}01;$$

e

$$A_o b^2 \approx 0{,}05.$$

Le lineas rotational esseva identificate per le uso del effecto Stark. ô

CALIBRATION DE SPECTROMETROS INFRARUBIE DE BASSE RESOLUTION

R. NORMAN JONES e al. del Division de Chimia Pur del Consilio National de Recerca (Ottawa 2, Ont., Canada) ha mesurate 77 bandas in le spectro infrarubie de indeno inter 690 e 4000 cyclos/cm con un precision absolute ab ±3 a ±0,2 c/cm, usante un rete de diffraction (Spectrochimica Acta 17(1961)77-81.

Cyclohexanona e camphora (0,8 pro cento per peso) pote esser addite pro provider bandas additional inter 1700 e 1750 c/cm sin displaciamentos significative del positiones del maximos de indeno que occurre extra iste region.

Iste systemas liquide es chimicamente stabile quando placiate in ampullas claudite, e es recommendate pro le calibration de spectrometros de prisma. ô

FREQUENTIAS DE GRUPPO

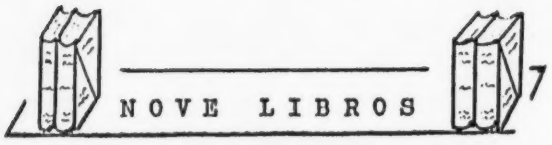
DR. JONES etiam ha preparate cartas que summarisa le principal frequentias de gruppo de compositos organic observate in le spectros infrarubie.

Tres series de cartas da le frequentias pro hydrocarburos, compositos oxygenate, e compositos que contine altere elementos.

Tabulas I - V tunc da subdivisiones plus detaliate del plus importante assignationes de gruppo. Istos es basate super mesurationes con liquidos pur, o con solutiones in CCl_4 e CS_2.

Cinque referentias es date a previe summarisationes de tal frequentias de gruppo. Istos include le libros de Bellamy, Brügel, Jones e Sandorfy, e Lecomte, si ben como le articulo de Colthup in J. Opt. Soc. Am. 40(1950) 397.

Interessatos debe requestar "NRC Bulletin No. 6" ab Dr. Jones al supra-date adresse. ô



• Gruppentheorie der Eigenschwingungen von Punktsystemen (Le Theoria de Gruppo del Vibrationes Characteristic de un Systema de Punctos). FRANK MATOSSI. Springer-Verlag, Berlin, Göttingen, Heidelberg; 1961. 191 ps. 25 figuras. DM 39,-.

UN INTRODUCTION al methodos gruppotheoric que es nunc frequentemente usate pro computar le frequentias characteristic de moleculas e (con minus detalios) de crystallos. Le fundationes mathematic es tractate minutiosemente, e le application del methodo del coordinatas de symmetria es explicate grandemente con le assistentia de exemplos.

Le theoria de gruppo es considerate hic como un methodo auxiliari del physicista molecular. Assi es introducite solmente lo que es necessari pro le tractamento de vibrationes molecular. Nonobstante, in tanto que possibile, toto que es pertinente es includite. Le theoria es disveloppate systematicamente, sed semper in connection con su applicationes physic. Le tractamento es destinate non solmente a dar al physicista molecular un utensile, sed etiam a servir como un introduction pro le non-specialista al usos del theoria de gruppos in le problemas physic. Le limites del applicabilitate es explicate con le assistentia de resultatos empiric.

Provas mathematic non es negligite, sed frequentemente istos es solmente un prova de sufficientia, non pro un necessitate, proque isto suffice pro un comprehension.

Le tractamento del coordinatas de symmetria es basate essentialmente super le methodos de Bhagaventam-Venkatarayudu, sed illo es plus profunde e systematic que lo de iste autores. Iste libro va esser multo utile pro le spectroscopistas.

• Group Theory in Quantum Mechanics (Le Theoria de Gruppos in le Mechanica Quantic). VOLKER HEINE. Pergamon Press, Headington Hill Hall, Oxford, Anglaterra; 122 E. 55th St., New York 22; 1960. 468 ps. 14 x 21 cm. $15.00.

LE OBJECTIVO es introducer le tres usos principal del theoria de gruppos in le mechanica quantic. Istos es:

1) Pro marcar le nivellos de energia e le statos characteristic correspondente;

2) Pro discuter qualitativemente le finder del nivellos de energia quando terminos de correction es addite a un function Hamilton approximative; e

3) Pro assister in le evalutation de elementos de matrice de omne sorta, e in particular pro provider regulas de selection general pro illos que non es zero.

Le thema es a monstrar le maniera de attinger iste objectivos per un consideration del proprietates de symmetria del function Hamilton e como iste symmetrias es reflectite in le functiones de unda.

• Bibliographia de Dictionarios Scientific e Technic Multilingual. Unesco Publications Center, 801 Third Ave., New York 22; 1961. 236 ps. 15 x 24 cm. Quarte edition, revidite. Trilingual: anglese, francese, espaniol, Papiro. $3.50.

INFORMATIONES IN re dictionarios multilingual, complite o in preparation. Un de istos, al p. 44, es:

545.82 - De, El, En, Interlingua, It, Pr, Ru - CLEVELAND, FORREST F.; GODE, ALEXANDER; et alii. Dictionario multilingual pro le spectroscopia. New York: Storm Publishers, 80 East Eleventh Street. (In prep., ca. 1500 t. e Interlingua def.)

De = germano, El = espaniol, En = anglese, It = italiano, Pr = portugese, Ru = russo, ca. = circa, t. = terminos, def. = definitiones. Infelicemente, Fr = francese esseva omittite.

DICTIONARIO MULTILINGUAL PRO LE SPECTROSCOPIA

Per Cleveland; Bonino, Dupeyrat, Matossi, Morcillo, Stammreich, Wolkenstein; Herzberg, Mulliken; Gode

Parcella 2; pro Parcella 1, vide Spec. Mol. 10 (1960)52-3

λ - Longitude de unda.

μ - Micron.

micron μ - Un unitate de longitude, specialmente de longitude de unda, equal a 10^{-6} m. Un micrometro.

a micron
e micra
f micron
g Mikron
i micron
p micron

spectrophotometria - Le arte de comparar, photometricamente, le intensitates de lineas o bandas in spectros. Le uso del spectrophotometro.

a spectrophotometry
e espectrofotometría
f spectrophotométrie
g Spektrophotometrie, Spektralphotometrie
i spettrofotometria
p espectrofotometria

spectrophotometric - Del, o pertinente al, spectrophotometria.

a spectrophotometric
e espectrofotométrico
f spectrophotométrique
g spektrophotometrisch, spektralphotometrisch
i spettrofotometrico
p espectrofotométrico

spectrophotometro - Un instrumento pro comparar le intensitates del lineas o bandas correspondente in spectros.

a spectrophotometer
e espectrofotómetro
f spectrophotomètre
g Spektrophotometer
i spettrofotometro
p espectrofotómetro

spectroscopic - De, o pertinente a, un spectroscopio o le spectroscopia.

a spectroscopic
e espectroscópico
f spectroscopique
g spektroskopisch
i spettroscopico
p espectroscópico

spectroscopio - Un instrumento optic pro le observation qualitative de spectros.

a spectroscope
e espectroscopio
f spectroscope
g Spektroskop
i spettroscopio
p espectroscópio

ultravioletto de vacuo - Le region del spectro electromagnetic con longitudes de unda inter 10 e 2000 Å, in le qual le spectrographos debe esser vacuate a causa del absorption atmospheric.

a vacuum ultraviolet
e ultravioleta de vacío
f ultraviolet lointain
g Vakuum-Ultraviolett
i ultravioletto estremo
p ultravioleta de vácuo

Å - Ångström.

angstrom Å - Un unitate de longitude equal a 10^{-8} cm, usate primarimente pro le expression del longitude de un unda electromagnetic.

a ångström
e angstrom
f angström
g Ångström
i ångström
p angström

---

a = anglese, e = espaniol, f = francese, g = germano, i = italiano, p = portugese. Russo essera includite. ô

• OCTOBRE 9-12. 11me symposio annue super recente disveloppamentos in instrumentation e methodos de recerca. Bethesda. (J. B. Davis, National Institute of Health, Bethesda 14, Maryland, S.U.A.)

• JANUARIO 10-12. Seminario del sudest super le spectroscopia. Universitate Florida. (W. T. Tiffin, Collegio de Ingenieria, Univ. Fla., Gainesville, Florida, S.U.A.)

• JANUARIO 25-26. Association Spectroscopic del West. Asilomar, California. (R. C. Hawes, Corporation Applied Physics, 2724 South Peck Road, Monrovia, California, S.U.A.)

• MARTIO 5-9. Conferentia Pittsburgh super le chimia analytic e le spectroscopia. Hotel Penn-Sheraton. (L. P. Melnich, Corporation U. S. Steel, Monroeville, Penna., S.U.A.)

• MARTIO 28-31. Symposio super le spectroscopia del Instituto de Petroleo. Univ. London. (Secretario General, Instituto de Petroleo, 61 New Cavendish St., London W. 1, Anglaterra.)

• PRIMAVERA. Instituto de resonantia magnetic nucleari. Buffalo. (H. A. Szymanski, Depto. de Chimia, Collegio Canisius, Buffalo 8, New York, S.U.A.)

• APRIL 30 - MAIO 3. 13tie symposio annue, Societate pro le Spectroscopia Applicate (Section Chicago). Hotel Conrad-Hilton. (J. S. Ziomek, Depto. de Chimia, Univ. De Paul, 1036 Belden Ave., Chicago 14, Ill., S.U.A.)

• JUNIO 11-15. 17me symposio super le structura molecular e le spectroscopia. Univ. Ohio State. (R. A. Oetjen, Depto. de Physica, Univ. Ohio State, Columbus 10, Ohio, S.U.A.)

• JUNIO 18-22. Conferentia international de spectroscopia. Univ. Maryland. Societate pro le Spectroscopia Applicate. (B. F. Scribner, Bureau National de Standards, Washington 25, D. C., S.U.A.)

• AUGUSTO 21-24. Symposio international super le spectroscopia infrarubie remote. Cincinnati, Ohio. (E. A. Janning, Instituto de Recerca, Univ. Dayton, Dayton 9, Ohio, S.U.A.)

• SEPTEMBRE 10-15. Symposio international super le structura molecular e le spectroscopia. (Symposio international super le structura molecular e le spectroscopia, Consilio de Scientia, Parco Ueno, Tokio, Japon.) ô

-o-

REVISTA. Le largessas de lineas spectral e lor usos in le spectrographia. I. Rubeška e B. Polej (Ústřední ústav geol., Praga). Chem. listy 55 (1961)139-53. 45 referentias. ô

-o-

SPECTROPHOTOMETRO. Infrarubie. Coperi le region 2,5 a 15 μ in o 3 o 12 minutas. Duple fasce. Prisma de NaCl. Spectros registrate super papiro del mesme dimensiones como le papiro in un libro de nota (quaderno). (Corporation Perkin-Elmer, Depto. Sci 262, Norwalk, Conn., S.U.A.) ô

-o-

LAMPA RAMAN. Un lampa del typo Toronto e un circuito de excitation pro uso con le spectrometro Raman registrante E612 de Hilger es describite per G. J. Janz e al. (Depto. de Chimia, Instituto Polytechnic Rensselaer, Troy, N. Y., S.U.A.) in Applied Spectroscopy 15(1961)47-52. Etiam describite es un cella usabile a temperaturas usque a 575°C. ô

-o-

MICROCELLA INFRARUBIE. H. W. Schamp, Jr., e W. G. Maisch ha describite un microcella infrarubie que pote esser usate pro liquidos pur usque a pressiones de 12.000 atmospheras. Le articulo es in Rev. Sci. Insts. 32 (1961)414-5, e lor adresse es Instituto de Physica Molecular, Univ. Maryland, College Park, Md., S.U.A. ô

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FENESTRA INFRARUBIE. Un nove methodo de attachar un fenestra infrarubie a vitro es date per D. E. Martz in Rev. Sci. Insts. 32(1961)214-5. ô

Applied Optics

Editor: John N. Howard

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1963

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2. Babinet Solid Compensator
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Among other applications, precision calcite prisms made by Karl Lambrecht have been used for the universal polarizing microscope made jointly by American Optical Company and Dr. Shinya Inoué, a University of Rochester scientist.

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Dr. Inoué makes the disclosure in a paper presented at a meeting of the Biophysical Society at the Massachusetts Institute of Technology, at Cambridge, Massachusetts.

He said the microscope is 20 times more sensitive than previous instruments and detects phase differences of four-tenths of one-billionth of an inch or one-tenth of an angstrom. This measurement can be made on objects only two-tenths of a micron wide.

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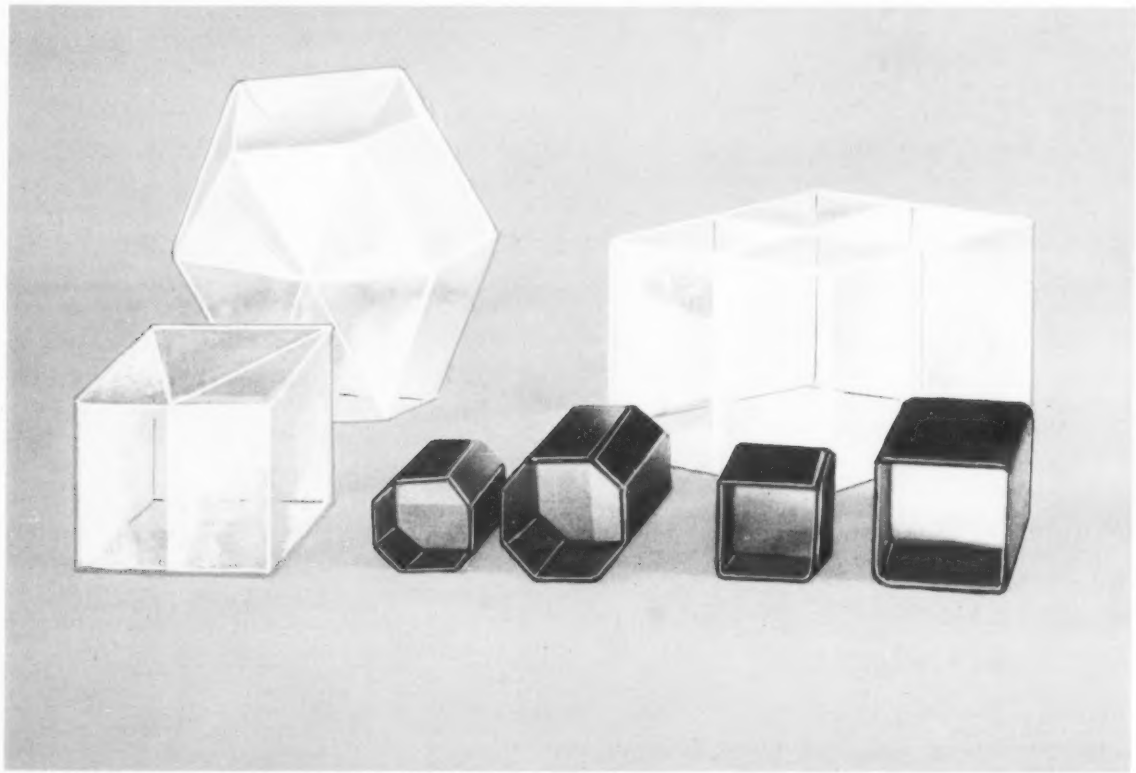
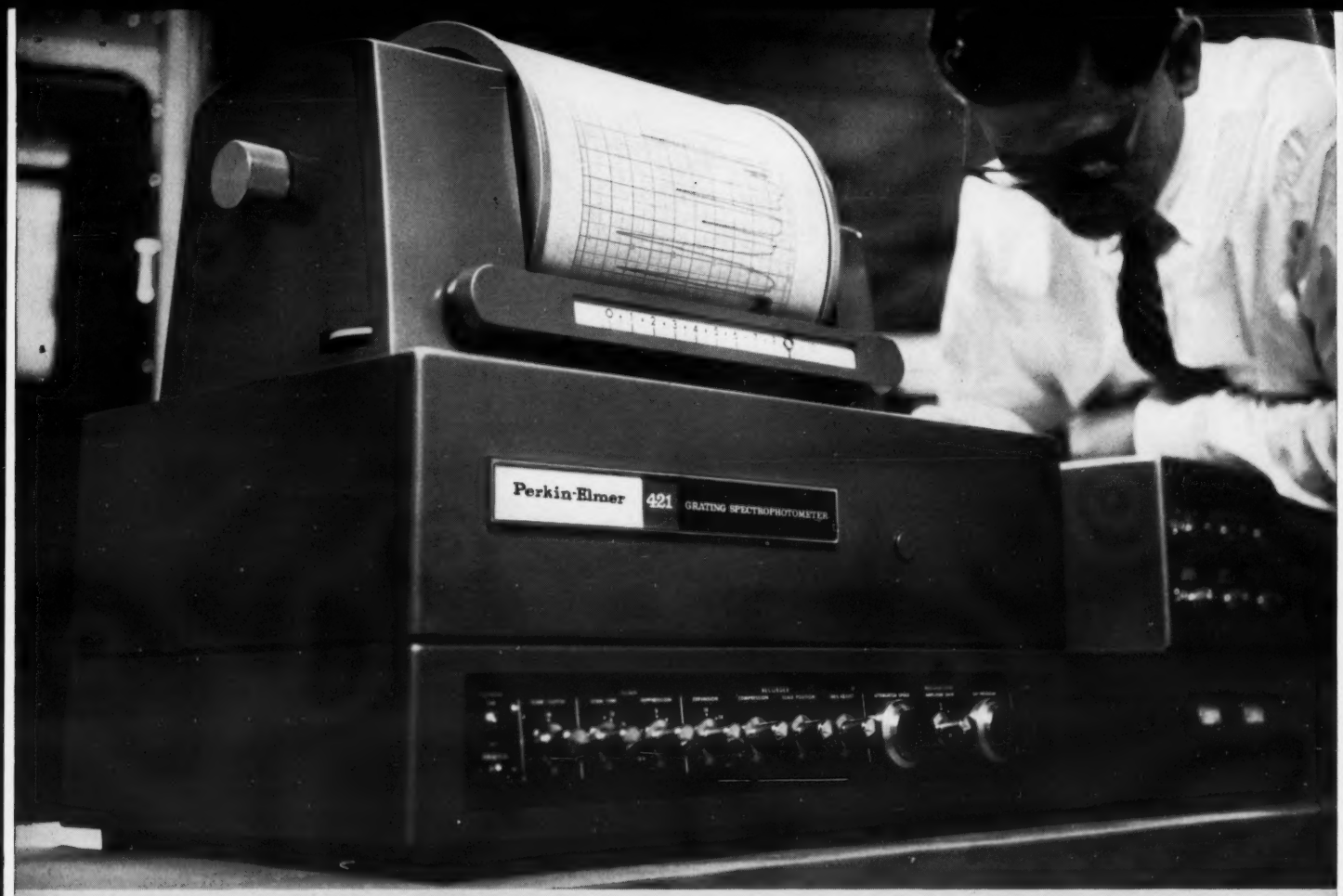
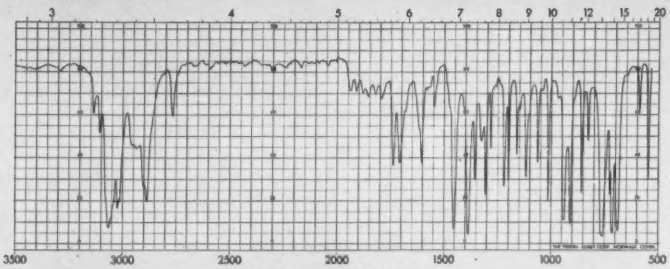
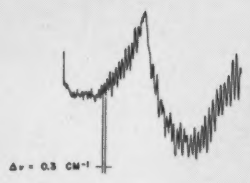




NH_3 between 970 and 920 wavenumbers.



Indene from 3500 to 530 wavenumbers.



CS_2 between 2200 and 2165 wavenumbers.

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Extended wavelength range: the Model 421 operates from 4000 to 550 wavenumbers—from 2.5 to more than 18 microns—routinely.

More precise quantitative measurements: high spectral purity afforded by the Model 421's resolution means close conformity of bands to classical absorption intensity laws.

All the instrumental operating features of other Perkin-Elmer spectrophotometers—double-beam optical null principle, speed suppression, automatic gain control, scale expansion and compression—are included in this new instrument. A full line of sampling accessories is offered. Write for complete information and sample spectra.

INSTRUMENT DIVISION
Perkin-Elmer *Corporation*
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